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Sunday September 21 1924

Left New Haven at 7.37 P.M. for St Albans, Vermont to meet Doctor Keith and Doctor Prindle. This is my fifth trip to northern Vermont since 1921. I hope this time we will be able to adjust the Adams Pasture succession.

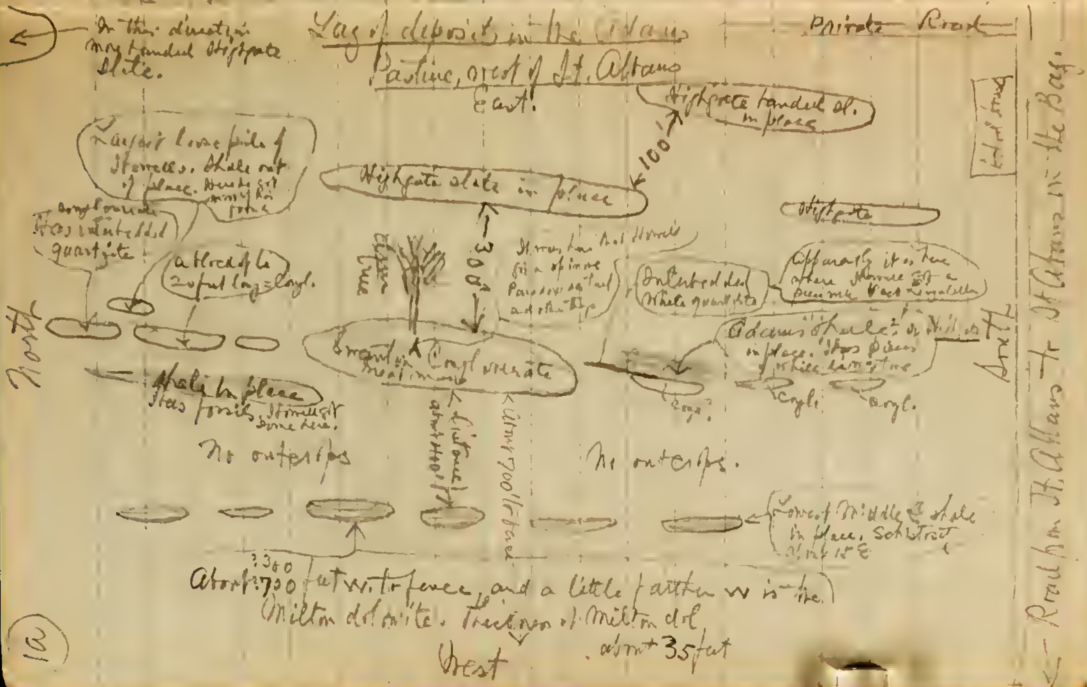
Due at St. Albans 8.10 tomorrow morning.

Monday Sep. 22 1924

Keith and Prindle at depot to meet me. Then talked over the stratigraphic issue west of St. Albans, and at ten o'clock we are off west of the Town about 2 miles to get started on a determined horizon and from it work up into the datable Middle Cambrian.

(1a)

Lay of deposits in the St. Albans Pasture, west of St. Albans



About 2 miles west and a half mile farther west are long exposures of the Mallett sandy dol. [Below them and to the west are [illegible] if marked, and there seem to be Bergmantown of the same series as at Phillipsburg.] I noted these last year with Keith and. We examined them (Mallett) on the south side of road about 1 1/2 miles west of H. Adams. Here the strata are in the lower part of the Mallett. [Their dip is not more than 15 to the east.] It has scattering angular pieces of intra-formational dol. There is considerable (may be 10 feet) of rounded large grained sand that appears to be wind blown sand. There is considerable thickness of Mallett here, but by no means so great the thickness given by Keith for the Mallett at its thickest.

Then there is a steeply ascending road towards the east and on the north side near the first houses there is a good exposure of basal Milton dolomite. In appearance it is almost identical with the Mallett and at the most there is 35 feet here. North of the road in the bushes one sees that the basal part of the Milton is a giant conglomerate, a dolomite made up of rounded sand grains in which are pieces (angular) of the Mallett dolomite and [illegible] shale in sign of at least an erosion. It rests directly upon the [illegible] clastic, here in the upper

Worgina may occur here. Howell and I got the same thing on Aug. 12-1925

15
10
5 quartzite
5
35 of Milton

Then follows a foot of black shale, probably base of the Middle Cambrian shale series. This is 100 feet or more to the W of the first house on the N. side of St. Albans Bay road. The black shale is directly north of first house on rise to S. of same road. I should locate this place on next S.A. map measuring to the angle in Adams and allowing about 15 degrees to get the full thickness of the St. Albans shale.

Sep. 22, 1924

first feet of the "Roberton" we collected a number of Dicusia [illegible] (common), [illegible] and some obscure things. The whole of the Roberton here cannot be very thick, probably at most not as much as 200 feet. It is here a micaceous dark greenish sandy shale that breaks out in small lenticular pieces.

Above the basal 15 feet of "Milton" conglomerate follows more evenly bedded sandy grey dol. with an abundance of some soft small pieces of conglomerate, probably of the Roberton. These weather out making strata, about 10 feet thick that look like rusty slag, but it is all a conglomerate. On the [illegible] one sees a zone of thin bedded white quartzite about 5 feet thick followed by intraformational flat pebble conglomerate for 5 feet more. Then the rocks are concealed. For a short distance then one comes upon a good [illegible] of the Dinorski marble. Just a part of pink [illegible].

From here to the Adams Pasture fence can not be more than 1/8 mile, then at least 700 feet more to the "Craggy conglomerate" must be of Middle Cambrian or upper.

Before lunch we made a rapid survey of the Adams Pasture. Hartigan [illegible] held that the

(Later called Mill River)

This congl. could be called the Adams Pasture congl. and is to be regarded as the base of the Highgate shale series. It has no Missisquoi ls. flat pieces and should have no fossils younger than the St. Albans shale. Another exposure of it is to be seen near Rockledge.

This Adams Pasture congl. is also localized (see page (1a)).

I went over this field with Howell on Aug 12 1935

This is not the Swanton Congl. but one at the base of the Highgate shale. [It may be so far [illegible] not most apart.] It has no Missisquoi slaty ls. There is plenty of flat ls pieces some inches long but none have Mi. fossils. Cutting this congl. Howell got a obscure [illegible] tail and some other forms. The white quartzite with Kutorgina Lingulella was loose to the E of the congl. Maybe a post-layer

giant cong'merate near the middle of the pasture in the Swanton cngl. Therefore the shales in situ beneath are Highgate, and those above are Georgia.

After lunch we examined the pasture with some a-tried much to get fossils, and where a few were seen; the only important one was found by Prindle in the shale, just beneath the Swanton conglomerate an Agnostus near pisiformis. Then I made the sketch on page (1a) so that I may talk over with Howell the places he collected from. After reviewing the whole outcrops I talked over the sequence with Keith, and pointed out that the fossils gotten by Howell beneath the cong'merate are not Highgate, but Middle Cambrian. The question now arises what to call this shale — Milton or give it a new name — St. Albans

Above the Swanton conglomerate in the Adams Pasture lies the Highgate shales (and not the Georgia), these near the east end of the pasture become more and more banded, but not limy as at Highgate Falls.

— out of the li conglomerate

Sep. 22, 1924 (4)

Keith thinks the Middle Cambrian pinches out to the north. Clearly the fossiliferous Milton of the Highgate Gorge is not in the Adams Pasture. This pinching out he thinks is due to overlap and not to faulting. The intervals of erosion between the different formations is usually of considerable time geologically.

I doubt if the St. Albans shale has half the thickness north of Rockledge it has in Adams Pasture. It certainly is not present above Highgate Falls. Therefore it has pinched out and probably is gone even in the Hungerford Brook area.

Was here again with G. Howell on August 12 1925. Found 2 frag. of Paradoxides and other things. Howell had worked a half day here yesterday, and got some large smooth Agnostus, Cystid plates are common.

There is a wide stretch here of low land, looks like if all in shale - St Albans and Highgate. This wide level tract goes south [illegible] [illegible] road [illegible] Lake [illegible].

In places the St. Albans shale has limy bands, not limestone. One trilobite is out of this limy material. The bulk of the material is not of decidedly [illegible] dark blue shales. These [illegible] here over 12 feet thick.

September 23 1924 Tuesday.

Started out west on the road to St Albans Bay and then south along the Rugg Brook road to the place that Raymond and I last year thought was Colchester. The place is on the land of Martin Conners, and south of a cross road into St. Albans.

At the corner of the St. Albans Bay and Rugg Brook roads we yesterday saw the "Milton" with a little of the St Albans Middle Cambrian slate. On the west side of the Rugg Road all is Milton and not Mallett as I have it on last years map. On the east side, Martin Conners land there is more Milton and the highest bed is a dolomite conglomerate. It has Mallett dolomite blocks up to 4 1/2 feet across. The matrix is a sandy dolomite. There are other dol. congl. lower in the hill to the east.

Over the highest and congl dol. congl. lies to the east the St. Albans dark blue shale. We pounded slate for more than one hour without getting fossils, and then near the Conners south fence we came upon an exposure that yielded a number of trilobites. Among them are

Aug. 14-1925 went over the road crossing [illegible] Brook [illegible] Stowell but turned near the place of the Ordovician [illegible] See the map. Therefore there is here [illegible] of the [illegible]. St Albans up to the 20 feet of Milton. To the E. of the [illegible] E. to the next angle.

The question must be answered is there a break between the Milton dol. and St Albans shale. So far I have no evidence [illegible]. Stowell tells me he [illegible] an Agnostus out of the Milton on the [illegible] Quarry lot. [illegible] should be [illegible]. [illegible] should be [illegible] [illegible] [illegible] Milton [illegible] [illegible] [illegible] the [illegible] E.

two glabella of Paradoxides and a cranidium of Agnostus. We have therefore now established the presence of Middle Cambrian slate in place. Farther east the land is low and we could see no further outcrops. I took away a bag of slate having fragmentary fossils.

In the afternoon went over the same N.-S. road to Rugg Brook but soon after getting on this N.-S. Road went west over the Milton and soon came upon a cliff of the Colchester slate here very much twisted. Farther west is Mallett. Saw no fossils, although all of us looked for them. After going south about 1/2 mile the Mallett crossed the road, and at the next south cross road the Colchester crossed it. It is well exposed in a cliff to the east of Rugg Brook, and although all of us searched long for fossils none were collected.

Just east of these Colchester slates is a little of Milton dolomite, probably less than 20 feet is shown, and it is overlain to the east by the St. Albans Middle Є. slates. This greatly thinned Milton Keith explains as due to stratigraphic overlap, the sea here coming in late.

Note that there is here no Missisquoi Ls. The cgl. must again be the [illegible] [illegible] at the base of the Highgate shale series. Dip about 20° in this.

These Middle Cambrian slates do not extend to the east far, and the next sharp rise in the road brings in to the south of the road a fine exposure of limestone conglomerate. It has at the base, overlying the St. Albans slate, a sandy dolomite about 6 feet thick that interbedded passes into a fine pebble li. cngl. Higher up there is from 15 to 20 feet of knobby limestone conglomerate, in which there is tan slaty limestone and [illegible] li. Some of the pieces about 3 feet across. Found no fossils in it.

Overlying these li. cngl. comes the Highgate slate, here decidedly banded as at [illegible] Hill. Saw no fossils in it. [illegible] and determined.

So far have seen no Georgia slate.

[illegible] of the conglomerates of Vermont so far we has seen pieces [illegible] ton or [illegible], or of the eastern Cheshire quartzite. [Later on we see a few pieces of [illegible].]

See these fossils — very important.

loose piece of
In a_n [illegible] insecta lie. then lately
obtained a piece [illegible] [illegible] in the Lr. Carb. above the Mid E.

September 24 1924. Wednesday.

Started north on Rattledge to see the great boulder and the [illegible] conglomerate about it.

Prindle soon had a large piece of li. out of the conglomerate (near the summer houses) that yielded a large lot of Milton fossils like those described by Raymond. Keith also found some of the same boulders. Each boulder is wrapped separately. This shows that the congl. is at least post fossiliferous Milton, = Missisquoi li.

Then Prindle found a place next to the great boulder where there was a bed of sandy limestone, this described in the paste of the conglomerate. This bed about 3 inches thick pinched out in one direction and was cut off by boulder in the other, the whole about 4 feet long. It had fossils and Strike & I spent more than one hour at it and got about a half dozen fair pieces of trilobites. It should date the age of the conglomerate = Post Highgate = Beekmantown.

We then went to slate exposures a short distance to the S.W. where there was another li. conglomerate about 10 feet thick (Highgate (?) conglomerate). Above it was a more sanded slate, and below it Prindle had gotten a large Ophileta and a small trilobite head. I saw that these fossils are the same we got yesterday on Martin Conners land. After working

(8a)

It is overall then a good locality for Paradoxides fossils since the cleavage and bedding are alike. Much Salenten easily got at.

August 12-1925 Examined drift hill north, and to the north [illegible] a lot of material, among them two good fatellas of Paradoxides. All suggest high Mid. C. I took several things, out of face and one there very called trilobite.

All below refers to page (8).

The li. conglomerate at the base of the Highgate is from 8 to 10 feet thick and is mainly of white birdseye mag. li. seen as ledges in the L.C. The pieces are angular to subangular and range up to 8 feet long, but mainly below 2 feet. The paste is a sandy limy rusty weathering filler. Here and there are pieces of 18" long of a very sandy dol. such as one sees in the Mallett. Lying there is no Milton dol. though there is some not far to the W. There is not a piece here of the thin bedded Missisquoi, nor did I see a trace of a fossil in any of the li.

This congl. runs N-S. for 75 yards; then none for 60 yards when there is more congl. for 15 yards. Close where the Highgate shale sets directly on the St Albans shale. There can be no doubt that this is a basal conglomerate.

here an hour we got a number of trilobites, and finally I got a fair Paradoxides flabellas. I had some - ? other fragments of the same trilobite, too poor to recognize. Therefore the slate in St Albans = Middle Cambrian. Farther west there is about 50 feet of Milton dolomite, a sandy dol. with one quartzite bed.

Beneath the Milton is flaggy sandy slate in layers? Some of it is current rippled. Keith says it is unmistakably Cambrian.

In the afternoon went north to Skeels Corners and then west a few hundred feet. Worked north and west of the Swanton conglomerate. Beneath it there is a well exposed series of well banded dark blue Highgate slate. Prindle got few cheeks of Ptychoparia and that was all the fossils we saw in it. These were fairly common.

Beneath these banded slates are other dark slates not so fine grained, that may be of Mid. C age, but we saw no fossils in it, nor is there here a limestone conglomerate to separate the two masses of slate. The thickness here is probably one-third that seen further south.

evidently the Middle Cambrian is pinching out to the north.

Farther west was a small thickness of sandy dolomite, followed downward by a zone of white quartzite, and still lower a zone (? 5 feet or so) of dolomite conglomerate. This is undoubtedly the Milton. The whole is less than 35 feet thick.

Still farther west and at once beneath the Milton came in the Colchester sands and lime slates. I saw few fragments of trilobites, but none were determinable. One fragment may have been [illegible] of Olenellus.

The first place visited this afternoon was about 1/3 mile N.W. on Swanton-Highgate Pike. Here we saw what appeared to be about 30 feet of Milton. Its top was the dol. conglomerate with blocks of oolite, and beneath with the greater thickness of a milky white limestone. On either side there was no strata to be seen in the farm lands.

The morning was very productive, but the afternoon was negative so far as fossils are concerned.

in Miriogui

Much of the li. of this formation here is made up of the thin-bedded up. Trilton, probably 3 [illegible] and cemented by a sandy dolomite. None of the congl. has foreign rocks, all are from the Stallett up to the up. Trilton.

The lower beds of "Shelburne" by huge like marble are metamorphosed into marble but show no flow structure. The Shelburne is known north of the Winooski river, and yet it is common in all [illegible] [illegible] [illegible]. It must have been in place near at the [illegible] of the Trenton deposition. We are [illegible] Shelburne li., which one also meets in the drift at the base of the [illegible]ate.

September 25 - 1934 Tuesday.

Started in at the Scranton conglomerate locality (no. 11 of map), 3/4 mile south of Rockledge. First examined the great block of Lower Cambrian white li. It is of the same li. as the greater block of Rockledge. Shows much flow structure and the mosaic structure and the dolomite fragments. Asked Prindle when this metamorphism took place and after looking over the block he said before the time of its burial in the Scranton conglomerate. Every one who has seen these masses comes to this conclusion, and yet no one knows of a Cambrian orogenic time. One is led to this conclusion ^time^ because ^of orogeny and metamorphism^ of the great metamorphism of the block, and another one close by with the same flow structure, ^not often^ contrasted with the other ^associated^ li. blocks none are seen to have flow structure and ^furthermore^ none are drawn out. Keith thinks of these similar li. blocks in the Colchester ^conglomerate^ farther N.W., ^a few^ tons of which I have also seen. How these great blocks got into the Scranton congl. is not known, unless they slid down hill into position, or fell from a "sea cliff." The

Missisquoi limestone

St. Albans slate

only other way these large blocks could have gotten where they are would be by ice action. In this connection one sees not the slightest evidence of ice action; nor strange rocks except those of the immediate formations.

The great block, i.e. the mantle rests very irregularly upon the ~~Upper Milton~~ bone bedded lm. Priddle soon had a ledge with fossils and finally we all concluded that these beds are in place and that upon it rest the great block. I then broke rock for nearly two hours and got out a number of fossils, among which Agnostus is most conspicuous. All reminded one of the middle fossil zone of the Upper Milton, and this trended to the view that the U. Milton is here in place. Before I told Keith this he was holding the beds to be the waste filling in the space underneath the great block.

The shales beneath these Upper Milton lm and away of the great block are therefore Middle Cambrian. There is a great width of these shales,terminated to the west by the thin basal part of the Lower Milton. Priddle and Keith collected a few fossils and when I saw them concluded they were of M.

August 12-1935

It may be that the congl. [illegible] [illegible] in the Upper Milton = Chinisioqui seen at High Falls [illegible]. As it has then fossil pieces it shows that some of the Lower Minisqui must have been exposed to get into the conglomerate.

Chinisqui limestone

Cambrian time. See the small lit. [illegible] true [illegible].

This Upper Milton discovery puts a new light on the Swanton congl. It is no longer at the base of the Ord. but at the base of the Highgate.

Rockledge appears to me to rest upon the Highgate, ranging above.
Certainly [illegible] no Upper Milton here.

After lunch we went into the gorge of the Missisquoi at Highgate Falls, and now we see that the Swanton congl. is also here, and that it follows in sequence and without break upon the thin bedded Upper Milton and is followed by more thin bedded Milton. Finally there is another large block [illegible] into the thin bedded Milton. There is a little disturbance of strata beneath the block. This is near the Power House leading into the gorge. Still more of the Upper Milton in heavy dolomites appears to the upstream end of the Power House and then the Highgate slates commence. There is no break here in the deposition in the Missisquoi Highgate series.

We then went down stream to determine the base of the Upper Milton. I [illegible] out to Swift-

The [illegible] [illegible] rock is unknown in any of the other dolomites. Therefore it has characteristic value.

Here in the gorge one sees about 200 feet of the true Milton, and then all rocks. [illegible] are at an end.

Gorlin Conglomerate.

the place I got the Lower Milton fauna collected the year Hunton was with me. Keith included all the Milton dolomites before these thin bedded basal Upper Milton limestones, and since they had Walcott said that they are of the true Milton. It is a series of intraformational flat pebble sandy conglomerates.

If this is true then we have here a discon-formable contact of the Lower or true Milton followed not by the M. C. slates, but by the Upper Milton thin bedded limestone series. The strike of the Lower Milton is 30 degrees different from that of the Upper Milton. I propose to call the Upper Milton, the Missisquoi limestones. The Middle Cambrian slates will be called the St. Albans slate. The Swanton conglomerate name will be retained as a member of the Missisquoi.

The Corliss Ledge conglomerate at base of the Georgia we will call the Corliss conglomerate.

See the detailed measured section made the year before and fit into this one.

The lowest fossil zone in the Mississquoi makes the base of this formation. It is a thin bedded li. zone, the li. separated by thin beds of dark to black shale, about 8 to 10 feet thick. Over it lie 6 to 8 feet of a gray quartzite. Higher there is a covered zone of considerable width, and then another quartzite of 14 feet or more thickness. Then another covered zone, followed by 3 to 24 feet of dolomite, then the black shale zone, over which lies the main mass of thin bedded li. and zones of intraformational flat pebble sandy dolomite, etc. up to the top of the Mississquoi limestone.

We then went to the little quarry in the Colchester road metal diggings about 1/2 mile N.W. of Highgate Center. Much quarrying has been done since last year and we see the strata now fuller than ever. Below are exposed about 6 feet of laminated black sandy slate and thin beds of sandstone. Then about 14 feet of sandy dolomite, followed upwards by about 6 feet of thin bedded sandstone and some

1932 Nov 25. Not over 60' }

([illegible] flaty dolomites)
slate that have the Linnarsonia taconica and Acrothele gotten in previous trips. Higher still then follows the true Milton. In this general region Keith holds that the Milton is not far from 800 feet thick, and that the Mallett has a like thickness. There is a remarkable swelling out of the Milton since to the south of Rockledge there is from 300 to 500 feet of Milton followed by some hundreds of feet of St. Albans slate.

We then motored about two miles to the northwest through parts of Mallett to the Dake monument, a large boulder of rhyolite. It is an erratic from Canada and is smoothed almost to a polish by the glaciers. It is one of the most faulted masses I have ever seen and must have taken place under [illegible] [illegible] [illegible] the them are recemented. It is one of the most [illegible] monuments and very appropriate to the place.

Then motored N.W. and passed large quarries in the marble of the early Beekmantown. The same zone seen at Philipsburg.

Chazy near Stift gate Spring

Then S.E. about 1/2 miles where Beekmantown, Colchester and Chazy are all near together. Must be faulting here. The Chazy is very thick bedded, and one of the beds is made up of Strophostylus. Have two pieces. It was not too hard to see fossils.

It may be that the "Egg" Rock was not in the [illegible], but Keith and Prindle thought it was. Prindle looked all around for another rock with these points but found none. Finally concluded that the "Egg" was not in place.

September 26-1924 Friday.

Started north on Highgate road to next left hand road north of Okeels Corners going west. At the corners is Iranton conglomerate, and west of it is the well banded Highgate slate going down to the thin dolomite layers seen in the Missisquoi gorge. These make a west facing cliff here. In these I saw fragments of the Ziphulella seen at Highgate Center, and fragments of unrecognizable trilobites.

To the west is low land without exposures, and then appears outcrops of Milton dolomite with intraformational conglomerates. The Milton terminates below in a giant conglomerate that to the south is chiefly made up of Milton dolomite fragments and to the north of several kinds of limestone and marble. Some of these blocks are up to 6 feet across. In one of the blocks to my great surprise I got Bryozoa and brachiopod fragments, showing that the limestone is probably of Chazy age. The limestone looks like the Chazy seen yesterday.

Below the conglomerate is soft dark to black slates in which no fossils were seen, but they have the looks of Middle Cambrian. Then a space without exposures followed by an outcrop of a white limestone interpreted heretofore as a lentil in the Cheshire. It looks much like the Rockledge one, but does not have its flow structure and [illegible] mica, calcite, etc., although it weathers in places like dolomite. The li. grades into dol. Keith says the knoll outside the woods is 300 feet long by 100 feet wide, while another one wholly in the woods is 150 by 130 feet across. In the knoll partially outside of the trees Prindle called my attention to cylindrical crystalline things that I could not make out. Later when I found the Bryozoa in the conglomerate it appeared that these also may be bryozoa more completely metamorphosed. If so these lentils are also about Chazy in age, and the overlying conglomerate is still younger. Keith sees strata structures here that lead him to think there are great faults connected with these

Dawson Cornellus head at 1c. (0)

deposits. In any event there is to the east Georgia slate followed by Swanton conglomerate. What the age of the black slate is and the two latter are we do not know.

See the samples of the above fossils.

There is then a wide belt of low land of Champlain sands in which no rocks are shown. Then the land rises into Milton dolomite and further west Colchester slate of my locality (10). Got a few fossils here. Then I looked at the little locality near loc. (10) and near the farmer's house. It is a doubtful [illegible] horizon. See the small samples. The slates around the locality are very much crumpled. The fossiliferous Colchester is underlain by the even bedded and banded sandy and flaggy dark blue micaceous slates. This horizon is seen in many places and it appears that [illegible] Parker's quarry is in this flaggy Colchester.

Then went southwest to a place marked red on my map and here in the flaggy Colchester we saw

many fragments of trilobite among them poor material of Hyolithes, Olenellus or Mesonacis, and probably one or two other trilobites. This flaggy material is near shore deposits and is rippled, mud cracks. Before getting to these flaggy deposits we found near Milton dolomite, Milton conglomerate with blocks up to a foot across. Little faults makes the section repeat itself.

In the afternoon went to Parker's Ledge south of St Albans to see what Keith interpreted as Cryptozoon. It looks so. Took along some samples. Associated are things that again look like Bryozoa. At the extreme north end of the ledge Keith got before Lingulella and trilobites. I took away several pieces that appear to have trilobites. To the south of the ledge one only gets black shales. Looked for fossils but got none. Last year Raymond thought he could find graptolites here. I agree!

Farther south and east the western of large ledge is another similar in nature. It stecles

All the congl. from Barge ledge south end are very much drawn out and schistose, so that I have feel that the metamorphism of Rockledge was made at the same time as these congl. In other words, when the rocks were [illegible] transformed into sch.

southward to the west E-W road. In this series of exposures for 58 miles there are many large blocks of white & blue marble and the regulation small pieces of the Missisquoi ls. These congl. begin in the west above the black shale with shales having small pieces of limestone, and then the regulation Swanton-like congl. bound together by sandy dolomite. In this line of congl. there are several large blocks of marble up to 60 or more feet long. Seeing so many I now feel we must have to call these blocks "in-place." In one place there is a high series (about 30 feet) of a coarse grained white quartzite. It is the same rounded large grained sand seen in the paste of the sandy dol. of the congl.

In places above these congl. there is a black silt shale, but farther west there is greenish sandy slate. Life unknown.

Even if we say that the largest blocks are lentils, still the congl. have large blocks of marble dumped into the mass along with the field of Missisquoi thin bedded limestone. Most of these blocks bear like shell worn,

September 27-1924 Saturday.

Shipped a 62 pound box by mail to New Haven, paid $1.^32

At 8 A.M. we are off to the Scranton conglomerate to the west of Georgia Center. Collected fossils out of the dark pieces of the Mississquoi limestone. These congl. are what Walcott, in his 10,000 feet of Lower Cambrian section from Parker Quarry just Georgia Center, called a limestone Conglom. See the fossils.

While I collected Keith walked northeast along the strike to the next north road (= Georgia Center) where we met him with the car. It was along this road from Georgia Center to the Vermont Central R.R. that Walcott measured his section. When we met Keith he had determined that the rock lie in a very flat anticline the strata dipping to the west. [illegible] we got on the Scranton conglomerate north of the road and then followed across the strike many hundreds of feet (1000) to the east. It here lies at a low angle and in shallow undulations, being underlain by the Highgate banded slates, these recommending the Milton

comes to the surface, either passing in sharp local folds or is pushed thrust the Stissgate into the second level of the Iwantan conglomerate. The [illegible] here is the usual sandy dol. with some black chert, and is often with interformational conglomerates or is actually broken up into a dolomite conglo.

Evidence from these congl. to the writer for Parker Quarry Lower or Middle Cambrian. To the [illegible] of Iwantan conglomerate are other banded slates, and these go to the east of Georgia Center. Their age is unknown.

On the structure of this region see the attached sheet.

Walcott in this area completely mistook the schistosity for bedding. Everywhere in the Stissgate the bedding is easily seen because of the decided banding. As for his faults and repetition of the section he is mistaken because of the assumed position of his limestone lentil that he calls an intraformational conglomerate in our Iwantan overlapping conglomerate. Walcott completely missed the structural relations, and through the stratigraphic

See the two of the slates of [illegible] angels I have taken for the [illegible] [illegible] Exhibition series.

Keith is not so excited about this as I thought he was.

sequence.

The Swanton cong. on the Georgia Center road is the prettiest exposure to be seen anywhere. Everywhere the cement is a sandy dol. and in places where the lines pebbles are absent there are strata of sandy dol. that one is apt to mistake for the Milton sticking through the Pillsbury. This in places is undoubtedly the case, but in several places we could trace the lime cong. passing into solid bedded sandy blue dolomite. Probably more than 3/4 of the Swanton is made up of the [illegible] bedded Mississquoi, along with pieces of all sizes of the white Mallets [illegible] marble. I saw one block 15 x 5 x 3 feet thick. Another block was 18 x 5 feet. Another block about 10 feet across looked exactly like the Rockledge block having the [illegible] and [illegible] dolomite.

It is now clear that here at least the Swanton overlaps the Pillsbury and the Milton. It is a transgressive formation. What the age is of the strata above the cong. is not yet determined.

Early Georgia about two miles [illegible]. Pre-Cambrian schist and metamorphosed dolomite, here, are of the Proterozoic.

It was 1.30 when we left [illegible] in [illegible]. Then motored through Milton (here along the road seems Cheshire quartzite), Essex Junction, and then along the valley of the Winooski through the Green Mts north of the Camel's Hump to Montpelier. All the rocks in the Green Mts are highly metamorphosed Proterozoic. [illegible] on to Barre, the town of greatest granite quarries and granite mills. Other granite farther great make the heart or core of the Green Mts though [illegible] [illegible] the highest Mts. The higher [illegible] lie to the west of the granite axis.

Stopped over night at the good Barre Hotel at Barre.

Sep. 28 - 1924. Sunday.

Left Barre, Vt at 9 A.M. The light gray granite here is of Post-Ordovician age since it cuts known Ordovician slates.

At 2 miles S.E. of Barre we stop to look at the hills metamorphosed slate that once furnished Richardson graptolites. It is fairly ... material so common in slates.

At about 3 miles S.E. of Barre we see one of the thickest piles of boulder clay anywhere, It is about 100 feet thick down to the streambed.

Keith tells me that he area of the Green and White Mts is a three elevated peneplain, uplifted during the Cenozoic.

Our route yesterday was up the Winooski and today down the White River. Came out into the Connecticut Valley north of Fairlee where we had lunch. Crossed over the Connecticut at Hanover N. Hampshire. Then through Hamilton. At 5.30 we left Prindle at his summer home at Peterboro, and thence into Greenfield where I am stopping with the Keiths.

The Barre granites, Albite rocks and Memphremagog are mainly parts of the same age = Late Devonian.

Sep. 29 - 1924. Monday.
With the Keiths and resting.

Sep. 30 - 1924. Tuesday.
To day A. Keith is to celebrate his 60th birthday. The day is a rainy one. In the afternoon Mrs Keith is baking a cake and making two quarts of bisque for a party this evening with the Porters and the Hopkins. In the morning Keith drove around in the car to sell [illegible] at the [illegible] for the evening.

Oct 1 - 1924. Wednesday.
A quiet day.
Keith tells me that the Barre granites are dated Ordovician metamorphosed strata. The same granites in the Lake Memphremagog area cut and metamorphose Middle Devonian strata. Therefore these granites are post Middle Devonian.
The Pennsylvanian strata of south-eastern Maine

connect with the bedding of Worcester, Mass., and are therefore of the same age. These strata in western Maine are cut and metamorphosed by granite that are of Post Penn. time. Then farther east there are no known Carb. strata across southern Maine until about St. John N. B. The "Late Devon." plant beds of Perry Maine are in all probability of Acadian time.

The strata on either side of the Green Mts have the schistosity dip towards the Mts. — Towards the east on the Lake Champlain side, and towards the west on the Conn. valley side.

The Leyden schists of supposed Silurian time go north [illegible] to [illegible] New Hampshire. They are also at Lake Memphr.

Oct 2-1924. Thursday.

A fine day and nothing to do but talk. The autumn colors are now beginning to show up in masses. The reds are more brilliant here than at New Haven.

At 3.45 I leave Greenfield and the Keiths. On the way the train delayed and instead of getting to Boston at 6.10 it is nearly 7 P.M.!

Had a cab take me to the Tourary Hotel.

Oct. 3, 1924. Friday

At 9.30 called on Raymond and talked Vermont until 1.30. At 4.45 I leave for New Haven.

Raymond had firmly concluded there is no Middle Cambrian in Vermont, and of course was greatly surprised that I should have gotten the Paradoxides to the S. and N. of the Adams Pasture. After explaining the whole situation

to him Raymond is not satisfied with the succession and the correlations.

Raymond thought the Milton might go unbroken into the Colchester since he regarded the dolomites with Olenides above the Colchester as of Milton age. When I told him that the Colchester has beds of dolomite, he had no objection in making the Milton Middle C. Of course, [illegible] shows an erosional interval between the [illegible] and the Milton.

The Swanton conglomerates he thinks may have been made at more [illegible], and without transportation during times of movement of the sea bottom. Such great blocks as Cobbles' he thought might be result of [illegible] type like extrusive explosion (and since metamorphism) in [illegible] will [illegible]. Raymond [illegible] that there was no [illegible] of the material. Otherwise I do not see [illegible] theory will hold.

Raymond appears to have learned little in the Selkirks and sees no problems worth taking up. Had a good time and saw much country but little of knowledge that was new.

Mr. Haven

Tuesday, August 11-1925

Started for St. Albans at 10.37 (sun time).
Will arrive tomorrow morning at 7 a.m.
With Howell, B. F.

Wednesday Aug. 12-1925

Worked all morning in the St. Albans shale south part of Rickledge.
In the afternoon talked over in the field the Adams Pasture succession, and then the [illegible] from Middle C.

Thursday August 13-1925

First visited the Grants and loc. 11. [illegible] Had [illegible] with a Missisquoi, [illegible] at St. Albans Middle C. In this case [illegible] the Missisquoi [illegible] to the [illegible] Keith [illegible] [illegible] be High, etc., [illegible] Aug. 11-14.
Then looked over the gorge at Highgate Falls and collected much Missisquoi for Howell.

In the afternoon visited all the places to the N.W. of Highgate Center, and then retraced our steps and went south to first west going road south of Shells Corner. Collected Colchester forms at loc. 10.

It rained some off and on during the day and now at 4 P.M. it is coming down hard and we had to quit.

St. Albans Aug. 14 - 1925

Started west over the St. Albans Bay road and then S. passed Conners House and to the railroad over Rugg Brook. Here we located the Milton and Swing E. then the St. Albans slate, Iberville shale, Highgate slate of the contiguous li. cong. Seems to dip at a low angle 10 to 15 degrees.

Then went south to School No. 7 and west half-way on this road. On the north side of road in Highgate shale lay a quartzite local bed about 5 feet thick. Then farther west, just beyond house saw a large block of li. in shale (see map). Farther w. on south side of road to the S.W. of a farm saw 5 lentils of li. close together lying in shale. They look like L.C. lentils but appear to be in St. Albans shale. One is 20 feet across and is exactly

Has structure with small sheets of dol.
like the great block at Rockledge or at Loc. 11. has a
Cornell took sick and we did not go out in
the afternoon. The day is dark and the ground is wet
from yesterday.

Saturday Aug 15 1925.

Left St. Albans at 8.30 via a Bus line
for Burlington, where we arrived at 10 30.

Then visited the Univ. of Vermont and the
Museum. Have a lot of material, zoological,
ethnographic and geologic, but the arrangement
is poor; the very worst in the geological.

Saw the Climactichnites slabs, a fine sandy slab
with the prints in high relief = casts. All are brownish
anachronous color. The rocks have not suffered from
compression. All so far as I could see had only
Climactichnites heads, and other [illegible] payments. I saw [illegible]
more than 1/2 dozen [illegible].

In the late afternoon went by trolley to Winooski
about one mile east of [illegible]. Here a
great quarry exposes about 50 feet of white [illegible]

= Helburne marble
Banded very soft marble, that all dips east at about 20 degrees. The manager told me it runs between 95 and 96 percent carbonate of lime, about 3.5 to 4 magnesium carbonate. One bed about 3 feet thick was rich in sand with the grains well rounded and large, an occasional grain 1/16 inch in diameter.

Keith says it underlies Milton but the actual contact he has not seen. It is underlain by the Phillipston which is Beekmantown. I am wondering if the Shelburne is not the same marble that constitutes the lower part of the Beekmantown seen at Phillipsburg. Saw no fossils, but the manager said Phillips had written to me. He also said there is a ridge or group of dolomites, I am surprised at fractured grains. And that I have seen the Shelburne I am certain that none of it occurs in the Ironton conglomerate. Probably all of these "Shelburne" blocks are lentils out of the Cr? erratics.

Stopping at the Vermont Hotel.

Sunday August 16-1925
Started for a steamer trip south through Lake Champlain and Lake George to Albany. Warm day, great crowds and less pleasure. Heavily crowded while to go sight seeing when the mist is out.
Got to Albany at 7.00 P.M. and wandered around among the hotels to find a room. Finally got one in a Turkish Bath House = Bensons.

Monday Aug 17-1925
Warm sultry day and as I was on an excursion down the Hudson concluded to take the train to New York. Left Albany at 8.20 A.M.

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